



UNITED STATES PATENT AND TRADEMARK OFFICE

ML
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,937	07/16/2003	Ramin Samadani	100110275-1	8859
22879	7590	03/28/2007	EXAMINER	
HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			PERUNGAVOOR, SATHYANARAYA V	
		ART UNIT		PAPER NUMBER
				2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/620,937	SAMADANI, RAMIN
Examiner	Art Unit	
Sath V. Perungavoor	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-18 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-6 and 10-15 is/are rejected.

7) Claim(s) 7-9 and 16-18 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/31/05.
4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. .
5) Notice of Informal Patent Application
6) Other: .

DETAILED ACTION

Requirement for Information

[1] Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

1. In response to this requirement, please provide the title, citation and copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, *particularly as to (1) switching between high and low resolution images (see fig. 3) and (2) generating high frequency component of the estimated high-resolution image by performing motion compensation (see fig. 9)*. For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.
2. In response to this requirement, please provide the title, citation and copy of each publication that any of the applicants relied upon to draft the claimed subject matter. For each publication, please provide a concise explanation of the reliance placed on that publication in distinguishing the claimed subject matter from the prior art.

[2] The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

[3] This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Claim Rejections - 35 USC § 112

[4] Claims 1, 2 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, Examiner suggests the following correction, “a remapper for mapping said high spatial frequency component to generate a motion-compensated high spatial frequency component estimate of said low resolution image frame”.

Regarding claim 2, Examiner suggests the following correction, “a controller for controlling said adding of said motion-compensated high spatial frequency”.

Regarding claim 10, Examiner suggests the following correction, “remapping said high spatial frequency component to obtain a motion-compensated high spatial frequency component estimate of said low resolution image frame”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

[5] Claims 1, 3, 4, 5, 10, 12, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parkeⁱ in view of Turnerⁱⁱ et al. ("Turner").

Regarding claim 1, Parke discloses the following claim limitations:

A system for reconstructing a high resolution image (*i.e. high resolution output*) from at least one image sequence of temporally related high (*i.e. 220*) and low (*i.e. 210*) resolution image frames, each of said high resolution image frames including a low spatial frequency component and a high spatial frequency component [*fig. 2; col. 5, ll. 5-10*], said system comprising: a [first spatial interpolator] adapted to generate a low spatial frequency (*i.e. 211*) component from a low resolution image frame (*i.e. 210*) of said at least one image sequence [*fig. 2; col. 4, ll. 47-61*]; a [high spatial frequency component generator] for generating a high spatial frequency (*i.e. 221*) component from at least one high resolution image frame (*i.e. 220*) of said at least one image sequence, said at least one high resolution image frame being closely related to said low resolution image frame [*fig. 2, col. 5, ll. 1-10*]; an [adder] (*i.e. 230*) for adding said ~~motion-compensated~~ high spatial frequency component estimate (*i.e. temporally interpolated high resolution frames, which have been high pass filtered*) of said low resolution image frame to said generated low spatial frequency component (*i.e. spatially interpolated low resolution images, which have been low pass filtered*) of said low resolution

image frame to form a reconstructed high resolution image (*i.e. high resolution output*) of said low resolution image frame [*fig. 2; col. 6, ll. 40-55*].

Parke does not explicitly disclose the following claim limitations (emphasis added):

a [remapper] for mapping said high spatial frequency component to a **motion-compensated** high spatial frequency component estimate of said low resolution image frame; and

However, in the same field of endeavor Turner discloses the deficient claim limitations, as follows:

A remapper for mapping a high resolution image to generate a motion-compensated (*i.e. move pixels based on motion vector*) high resolution image [*col. 4, ll. 60-67; col. 5, ll. 14-23*].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify Parke's temporal interpolation to include motion compensation as taught by Turner's temporal interpolation, the motivation being to generate images of a moving scene [*col. 1, ll. 56-60*].

Regarding claim 3, Parke and Turner meet the claim limitations, as follows:

The high resolution image reconstruction system of claim 1, wherein said first spatial interpolator utilizes a bicubic upsampling algorithm [*Bicubic upsampling is notoriously well-known. Official Notice is taken. See Zavaljevskiⁱⁱⁱ et al. at col. 4, ll. 1-5 for evidence.*].

Regarding claim 4, Parke and Turner meet the claim limitations, as follows:

The high resolution image reconstruction system of claim 1, wherein said first spatial interpolator utilizes a bilinear upsampling algorithm [*Bilinear upsampling is notoriously well-known. Official Notice is taken. See Zavaljevskiⁱⁱⁱ et al. at col. 4, ll. 1-5 for evidence.*].

Regarding claim 5, Parke and Turner meet the claim limitations, as follows:

The high resolution image reconstruction system of claim 1, wherein said first spatial interpolator utilizes a least squares error minimization algorithm [*Least squares error interpolation is notoriously well-known. Official Notice is taken. See Zavaljevskiⁱⁱⁱ et al. at col. 4, ll. 1-5 for evidence.*].

Regarding claims 10, 12, 13 and 14 all claimed limitations are set forth and rejected as per discussion for claims 1, 3, 4 and 5.

[6] Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parke in view of Turner further in view of Burt^{iv} et al. ("Burt").

Regarding claim 2, Parke and Turner meet the claim limitations as set forth in claim 1. Parke and Turner do not explicitly disclose the following claim limitations:

The high resolution image reconstruction system of claim 1, further comprising a [controller] said adding of said motion-compensated high spatial frequency component estimate of said low resolution image frame to said generated low spatial

frequency component of said low resolution image frame to optimize motion confidence.

However, in the same field of endeavor Burt discloses the deficient claim limitations, as follows:

A controller controlling (*i.e. through alignment parameters*) the adding (*i.e. fusion*) of input image and the mosaic to optimize motion confidence [*col. 10, ll. 16-23; col. 11, ll. 45-50*].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Parke and Turner with Burt to apply weighted the alignment parameters according to motion confidence values, the motivation being remove influence of erred motion vectors [*col. 10, ll. 16-23*].

Regarding claim 11 all claimed limitations are set forth and rejected as per discussion for claim 2.

[7] Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parke in view of Turner further in view of Griessl^v et al. ("Griessl").

Regarding claim 6, Parke and Turner meet the claim limitations as set forth in claim 1. Parke and Turner do not explicitly disclose the following claim limitations:

The high resolution image reconstruction system of claim 1, wherein said high spatial frequency component generator includes a downampler for downsampling at least one high resolution image frame of said at least one image sequence.

However, in the same field of endeavor Griessl discloses the deficient claim limitations, as follows:

A downsample (i.e. *MotionPyramid*) for downsampling at least one high resolution image frame [col. 6, ll. 1-27].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Parke and Turner with Griessl to downsample the high resolution image frame, the motivation being to perform hierarchical motion vector calculation [col. 4, ll. 60-65].

Regarding claim 15 all claimed limitations are set forth and rejected as per discussion for claim 6.

Allowable Subject Matter

[8] Claims 7-9 and 16-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

[9] Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Sath V. Perungavoor whose telephone number is (571) 272-7455. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Matthew C. Bella whose telephone number is (571) 272-7778, can be reached on Monday to

Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dated: March 21, 2007

Matthew C. Bella
Sath V. Perungavoor
Telephone: (571) 272-7455

- ⁱ US 5,025,394
- ⁱⁱ US 6,198,505
- ⁱⁱⁱ US 6,101,235
- ^{iv} US 5,649,032
- ^v US 6,370,196



MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600